REMARKS/DISCUSSION OF ISSUES

Claims 1-9 are pending in this application, with claim 1 being amended and claims 11-13 being cancelled.

Claim 1 is amended to eliminate the recitation that the deposition is in at least a high vacuum environment, as this limitation is inherent in the fact that the substrate material has metastable bonds on its surface immediately before the film is deposited on the substrate. That is to say, it is known to those of ordinary skill in the art that it is impossible to have metastable bonds on the surface of the substrate unless the substrate is in a high vacuum environment.

Applicant again believes it would be useful to review metastable bonds at this point. Metastable bonds are typically found on freshly prepared surfaces of materials with covalent bonds. For example, imagine a diamond crystal. Then break it in a high vacuum environment. The bonding between C-atoms on opposite sides of the break disconnect their bond. Each of these C-atoms now has a "dangling" bond. This "dangling" bond is not stable, but will connect to another "dangling" bond of another C-atom close by, which also has a "dangling" bond because it lost a neighboring atom during the fracture of the diamond crystal. The connecting bonds have to be bent to connect. That makes this bond "metastable."

Now open the system in which the diamond was broken to the air. Remember that we started with a fracture process in a high vaeuum environment. If oxygen atoms hit the fracture surface, they will bond with the C-atoms and get stuck.

The same thing happens in the present invention. The Ge-atoms like to form a diamond lattice with covalent (=directional) bonding electrons. If, while forming the substrate, the evaporation of germanium is stopped, we have "dangling" bonds at the surface, which will bend and connect with another "dangling" bond of a neighboring Ge-atom to form a metastable bond. If a metal-atom from the evaporator hits this surface atom, it will break the metastable bond, and form a primary bond with the Ge-film. All metal-atoms hitting the surface will get stuck, and one forms initially essentially a monolayer of metallic atoms. This gives metallic conduction.

If we let oxygen atoms flow into the high vacuum system after Ge-evaporation, they form an oxide film with the germanium, and all metastable bonds disappear. If we then deposit metal

atoms in this surface, the metal-atoms would not form primary bonds with the oxide surface. Instead, they would diffuse over the surface and connect with other incoming metal-atoms, forming metallic islands which may form primary bonds with the oxide. Even if the average thickness of the metal atoms is 5 nm, the islands would usually not connect, and the resistance would be very high.

Rejections under 35 U.S.C. § 103(a)

Claims 1-9 and 11-13 are rejeeted under 35 U.S.C. § 103(a) as being unpatentable over Hamada (US Patent Publication 2003/0000930). The rejection of the claims, as amended, is respectfully traversed.

For the examiner to meet the burden of showing a prima facie case of obviousness, all the claimed elements must be found in the cited combination of prior art. MPEP 2143A(1). Because not all the claimed elements are found in the cited prior art, it is respectfully suggested that the rejection is in error and that a prima facie ease of obviousness has not been made by the examiner.

Specifically, Applicant states that the claim limitations of (a) the substrate material having metastable bonds on its surface immediately before deposition of the film and (b) the current flow within the film is substantially parallel to the plane formed by the juncture of the film and substrate are not found in the cited reference.

(a) The claim limitation of the substrate material having metastable bonds on its surface immediately before deposition of the film.

Hamada always writes that the metal film can be deposited on the substrate by a vaeuum evaporation or plating process (e.g. elaim 6, page 2 paragraph [20], and page 2 paragraph [27]). No mention is made of metastable bonds (nor a "high vacuum environment", which would be required to produce metastable bonds) as required by claim 1. Both of the processes described in Hamada, i.e., vacuum evaporation and plating, yield metal layers with proper properties for his device. There is no need for a high vacuum environment for Hamada's device, which is why none is disclosed or suggested, and therefore, there is no disclosure or suggestion of metastable bonds.

In fact, the process in Hamada cannot result in metastable bonds on the substrate surface. For the plating process, the semiconducting substrate cannot be kept clean, and if any metastable bonds existed right after the evaporation on the substrate, they would bond to something (a contaminant) before plating started. Obviously the special growth mechanism required for the metal film on the semiconductor in the present invention is not required for the manufacturing of the mask in Hamada. Hamada does not disclose a special approach to deposit a metal film on the semiconducting substrate so that no contaminants could compensate for possible (but not likely) metastable bonds. A typical researcher writing a report or paper in which a special approach would be used would mention it, usually by referring to an 'in situ' vacuum process. No such mention exists in Hamada.

In fact, in the standard process of making metal films that are 50 microns or thicker for light reflection, there is no need to go to the extra effort to deposit the semiconducting substrate in a high vacuum system or to make certain that metastable bonds exist on the surface of the semiconducting substrate to insure bonding between substrate and metal film.

Thus, this claim limitation is not disclosed or suggested by Hamada.

(b) The claim limitation of the current flow within the film being substantially parallel to the plane formed by the juncture of the film and substrate.

Hamada discloses a laser device that contains a mask which consists of a semiconducting substrate 11, a metal film 12, and a second semiconducting substrate 12. The metal film has a pattern of holes, through which a laser beam shines on a plate below.

The examiner states that a current flows through this film. This is incorrect. No electric current flows through this plate. Only the optical properties of the materials are important in this application. It is required that the metal film reflects the laser light, and that the light which passes through the holes of the metal film can pass through the semicondicting film.

The wavelength of the CO2 laser given in the patent is such that the laser beam which passes through the metal holes will also pass through the Ge-substrates. The transparency of Ge to CO_2 was one of the reasons why germanium was picked as substrate for the mask. Again, no consideration for electrical currents was or is needed. Hamada simply does not need electrical

currents of any fashion for the device to work as intended, so there is absolutely nothing in the reference that could possibly disclose or suggest this claim limitation. There is no current flow in Hamada, and even if there were, it couldn't be parallel to the plane formed by the juncture of the film and substrate.

Thus, this claim limitation is not disclosed or suggested by Hamada.

It is therefore respectfully suggested that the rejection of Claim 1 under 35 U.S.C. § 103(a) as being unpatentable over Hamada is unfounded. Claims 11-13 are cancelled, thus rendering their rejection moot. Claims 2-9, being dependent upon and further limiting independent claim 1 should be allowable for that reason as well as for the additional limitations they contain. Reconsideration of the rejection of claims 1-9 under 35 U.S.C. § 103(a) is therefore respectfully requested.

In view of the foregoing, Applicant respectfully requests that the Examiner withdraw the rejections of record, allow all the pending claims, and find the application in condition for allowance. If any points remain in issue that may be resolved through a personal or telephonic interview, the Examiner is respeetfully requested to contact the undersigned at the telephone number indicated or by e-mail direeted to Chris@PatentingServices.com.

Respectfully submitted,

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